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REASONS IN FAVOR OF RETAINING THE GENERIC
NAME *CARCHARHINUS* BLAINVILLE, AND A PRO-
POSAL FOR IDENTIFYING ITS TYPE SPECIES AS THE
INDO-PACIFIC BLACK-TIPPED SHARK,
*C. MELANOPTERUS*¹

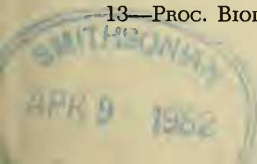
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This paper has two objects. The first of these is to review briefly the perilous generic status of *Carcharhinus* Blainville, 1816, and to advance reasons why this generic name should be retained. The second is a proposal that *C. commersonii*, selected as type species of *Carcharhinus* by Jordan and Gilbert, can be identified as a junior synonym of *C. melanopterus* Quoy and Gaimard.

In a thorough account, Boeseman (1960: 81) has shown that the well known and widely used generic name *Carcharhinus* Blainville, 1816, pertaining to the largest group of living sharks, is not available. More recently White, Tucker, and Marshall (1961: 276) have affirmed, independently, Boeseman's view of the unavailability of the name *Carcharhinus*, and have proposed to the International Commission on Zoological Nomenclature a means for stabilizing the name in its accustomed sense. Their proposal includes the arbitrary designation of *Carcharias milberti* Müller and Henle, 1841 as type species of *Carcharhinus*. In the account below evidence is given that *Carcharias melanopterus* Quoy and Gaimard, 1824 is a more logical choice as type species of *Carcharhinus*. White, Tucker, and Marshall have also shown that contrary to the general view Bosc's (1816: 277) selection of *Squalus carcharias* (presumably of Linnaeus, 1758) as type species of *Carcharhinus* Blainville, 1816 can be interpreted as valid even though the specific name *carcharias* was not listed by Blain-

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ville when he proposed the genus. Their interpretation depends on recognizing *C. lamia* (presumably of Rafinesque, 1810) on Blainville's list as a junior objective synonym of *S. carcharias*. If this interpretation is correct, Bosc's selection of a type species is the first valid one for *Carcharhinus*, and makes *Carcharhinus* a senior objective synonym of *Carcharodon* A. Smith, 1838. It is unlikely that there will be any dissenters to White, Tucker, and Marshall's view (1961: 276) that "... it is clear that Bosc's valid type-designation must be set aside," for otherwise the well established usage of *Carcharodon* for the White Shark, as well as that of *Carcharhinus* for the Gray Sharks, would be lost. The account below is given on the assumption that Bosc's selection will not be followed, and therefore deals only with subsequent selections of type species for *Carcharhinus*.

The unavailability of the generic name *Carcharhinus* hinges on the fact that Jordan and Gilbert, who first designated a type species for *Carcharhinus* from the fourteen specific names listed by Blainville under his original generic diagnosis, selected *C. commersonii* which was a *nomen nudum* when Blainville introduced it (1816a: 121, 1816b: 264). Blainville validated *C. commersonii* in a later account (1825: 90) by indicating that it was based on a shark figured in Lacepède (1798: 169, pl. 8, Fig. 1), but that action did not make it available for selection as type species. Consequently, the first acceptable designation of a type species for *Carcharhinus* is that of *C. vulpes* by Fowler (1908: 62). Fowler's designation makes *Carcharhinus* Blainville, 1816 a synonym of *Alopias* Rafinesque, 1810, the genus of thresher sharks.

Fowler's procedure, although correct, has not been accepted by most workers, who with few exceptions (see Boeseman, 1960: 81) have retained the name *Carcharhinus*, and recognized *C. commersonii* as type species. Arguments favoring their action include the view that Jordan and Gilbert's selection of *C. commersonii* as type species was reasonable and legitimate at the time it was made, and should not be upset by nomenclatural procedures and regulations formulated at a later date. Excluding here the questions of legality, the chief disadvantage in recognizing *C. commersonii* as type species is that it has not been possible to identify *C. commersonii* with any certainty. However, a rather similar disadvantage applies to the type species of the two genera with most claim as substitutes for *Carcharhinus*. Thus *Glyphis* Agassiz, 1843 (p. 243, pl. 36, Figs. 10-13) has as its type species *G. hastalis* Agassiz, 1843, which is based only on two fossil teeth; these teeth resemble the lower teeth of *Carcharias* (*Prionodon*) *glyphis* Müller and Henle, 1841, which falls into *Carcharhinus* as currently recognized. The resemblance, though good, can scarcely be regarded as definitive evi-

dence of congeneric relationship. Likewise, *Galeolamna* Owen, 1853 (p. 96, No. 427) with type species *G. greyi* Owen, 1853, was based only on a pair of jaws held in the museum of the Royal College of Surgeons, London, and these are now lost as a result of bombing damage during World War II. The jaws were from a shark taken in South Australia and were not figured or described by Owen though he gave a brief comparison of the teeth with those of *Galeus*, *Lamna*, and *Carcharias*. The species is not identifiable from this comparison. Owen's species seems to have been overlooked until resurrected by Whitley (1932: 324). Subsequently Whitley discussed the species or referred specimens to it in four different accounts. These accounts introduce a great deal of confusion. Not only did Whitley change his opinion several times in identifying *G. greyi*, but it is also clearly evident that at least three and possibly four distinct species were referred by him to *G. greyi*. Thus in his first account (op. cit.) when he was relying only on Owen's meager comparison he stated that *G. greyi* "apparently refers to the South Australian Whaler Shark, a species which has been figured by Waite as *Carcharhinus brachyurus*." Two years later when he had still not seen type material he proposed (1934: 185) that "the status of Owen's name (*G. greyi*) is at present indeterminable, . . ." Following this he was able to examine the type of *G. greyi* in the Royal College of Surgeons, and published (1939: 231) a brief description of the teeth together with the statement that "the specimen is a South Australian Cocktail or Whaler Shark," i.e., the *C. brachyurus* of Waite. A year later (1940: 100, Fig. 88) his view was not as definite—"This is probably the Cocktail Shark . . ."—while in an appendix to the same work (op. cit. appendix C, p. 273, Fig. 303) he described and figured a Swan River Shark "which appears to be *Galeolamna greyi*, . . ." The Swan River Shark bears a strong resemblance to the Atlantic *C. leucas* and differs strikingly from Waite's *C. brachyurus*, particularly in the much more anterior position of its first dorsal origin, and the shape and size of its dorsal and anal fins. Lastly, in 1945 (pp. 1-4, Figs. 1-2) Whitley described three subspecies of *G. greyi* from Western Australia. His *G. g. greyi* from Esperance is a much longer-snouted shark than either the Swan River Shark or Waite's *C. brachyurus* and is clearly a different species. Similarly his *G. g. cauta*, though short-snouted, has very different teeth and a more rearwardly placed first dorsal than the Swan River Shark, while at the same time it does not fit closely with Waite's *C. brachyurus*. The Swan River Shark is recorded in the account as *G. g. mckaili*.

From the above brief review it is obvious that several interpretations are possible in recognizing the type species of *Galeolamna* from the three or four species which Whitley lumps under *G. greyi*. Thus choice of *Galeolamna*, or for that matter *Glyphis* also, as generic names to replace *Carcharhinus* would not bring about clarity, though it would conform to the rules of nomenclature. The disadvantage, on the other hand, is that by discarding the name *Carcharhinus*, we do so at the expense of established usage in a group where there has already been much con-

fusion, and where the nomenclature has taken a long period to become more or less stabilized.

It is the intention of the writer to appeal to the International Commission on Zoological Nomenclature to conserve *Carcharhinus* Blainville, 1816. The appeal will therefore support in principle that of White, Tucker, and Marshall (1961: 273), but will not support their arbitrary choice of *Carcharias milberti* Müller and Henle, 1841 as type species of *Carcharhinus*. Instead the appeal will include the request that *Carcharias melanopterus* Quoy and Gaimard, 1824 (Zool. p. 194), the widely distributed Indo-Pacific black-tipped shark, be designated as type species of *Carcharhinus*. This designation follows from the proposal that *C. melanopterus* is a senior synonym of *C. commersonii* which is generally recognized as type species of *Carcharhinus* even though it is not available. Evidence for regarding *C. melanopterus* and *C. commersonii* as conspecific is given below.

Blainville never described *C. commersonii*, but indicated that it was the shark figured in Lacepède (1798: 169, Pl. 8, Fig. 1) as "Le Squalé Requin." The introduction to Lacepède's account on page 7 of Volume 1, includes the statement that Plate 8, Figure 1 (among others) was copied either from an original drawing by Commerson, or from one made under Commerson's supervision. The textual account of "Le Squalé Requin" likewise includes citations from Commerson's manuscript. "Le Squalé Requin" is based therefore, at least in part, on material described in manuscript by Commerson, and published in Lacepède. However, the textual account of "Le Squalé Requin" in Lacepède is obviously heterogeneous (as the author intended), the synonymy including *Carcharodon carcharias* as well as *Carcharhinus* species. This introduces confusion in the text, because until recently it has not been possible to select the information relevant to *Carcharhinus commersonii*. As a consequence, the text has been mostly disregarded by authors endeavoring to identify *C. commersonii*, and only the figure of "Le Squalé Requin" has stood as its basis.

Boeseman (1960, Pls. 7-8), has shed light on the above by publishing a photostatic copy of the morphological part of Commerson's original manuscript, and a drawing of a shark made from the figure in Commerson's manuscript. There is no doubt as to the validity of the manuscript which was located in the Museum National d'Histoire, Paris. It is therefore now possible to identify those parts of Lacepède's text referring to Commerson's shark, including a description and measurements. As Boeseman (1960: 94) pointed out, the measurements have limited value because we do not know how they were taken, and because in several instances they do not agree with either the description or the figure. In terms of *Carcharhinus* species, the description is not definitive, but at least it provides information on some features which may be of value, viz., the color is grey above, white below; the head is depressed, the snout narrower but almost semi-circular from eye-to-eye; the nostrils are slightly nearer the eyes than the tip of snout; the upper teeth are triangular, serrated on both

margins, and in about 24 rows, while the lowers are narrower but also serrated; the first dorsal fin apex is blunt; the second dorsal fin is smaller than the anal, with a slender posterior tip; and the anal fin has a notched distal margin, and a tip reaching almost to the origin of the caudal fin.

Commerson's manuscript figure, reproduced in Boeseman (1960, Fig. 1, upper figure) was evidently carefully drawn. It agrees reasonably well with the description, though the nostrils are shown nearer the tip of the snout than the eyes (vice versa in the description). The salient features of the figure for purposes of identification are: the posterior tips of the second dorsal and anal fins reach back almost to the upper precaudal pit and the lower caudal origin respectively, and are subequal to the heights of these fins; the anal axil is noticeably behind the second dorsal axil; the first dorsal fin apex is rounded, and the fin itself falcate; the pectoral fin tip is narrow, almost pointed; and the anterior margin of the eye is anterior to a vertical from the point of the mouth. The specimen figured was a male, mature or near mature judging by the clasper size. The accompanying scale shows that the specimen was six feet long.

Attempts within the last fifty years to identify *C. commersonii* appear to have been made with the assumption that the species is an Atlantic or Mediterranean form. This assumption is incorrect, for as Boeseman (1960: 90) shows, the introduction to Lacepède (1798: p. ix, x) provides clear evidence that Commerson's figure was made from an Indo-Pacific specimen. The exact locality is unknown, but the figure must have been drawn either from an Indo-Pacific specimen taken when Commerson accompanied Bougainville on his voyage around the world in 1766 to 1769, or from one collected while Commerson lived on Mauritius.

Recent identifications of *C. commersonii*, dating from Garman (1913: 140), have been as *C. leucas* or *C. longimanus*, and are not supported by comparisons with Commerson's figure and text. *C. longimanus*, now known from the Pacific as well as from the Atlantic, has a characteristically longer and obtuse-tipped pectoral fin, a much broader based first dorsal fin, and a higher tooth count (29–31 teeth in upper jaws) than Commerson's shark. *C. leucas*, represented at least by the cognates *C. azureus*, *C. gangeticus*, *C. zambezensis*, and the Swan River *C. greyi* in the Indo-Pacific, agrees better with Commerson's account but does not have its second dorsal and anal fin tips reaching as far back as in Commerson's figure, while its first dorsal fin is broader based, less falcate, and with sharper pointed apex, to mention but a few of the obvious differences. Identification of Commerson's species as *C. leucas* would be very speculative.

Much the same can be said in comparing Commerson's account with specimens and/or literature of all other *Carcharhinus* species known from the Indo-Pacific and Atlantic. Although many species show agreement in some features, none show agreement in all. The absence of any

reference to black-tipped or white-tipped fins in Commerson's description of the color of his specimen excludes many species where such a pattern is conspicuous. The posterior position of the second dorsal and anal fin tips, which seems the most striking character in Commerson's figure, is matched in *C. falciformis*, *C. floridanus*, and *C. maldeloensis* among the more or less immaculate sharks. However, in these three species the second dorsal and anal fins are much lower and more slender than those in Commerson's shark, their heights only about half the lengths of their posterior tips, rather than equal to them.

Failure to identify the shark described and figured in Commerson's manuscript does not mean that *C. commersonii* cannot be plausibly identified. This apparent paradox results from the fact that Lacepède's figure of "Le Squale Requin," which Blainville referred to *C. commersonii*, differs sufficiently from Commerson's manuscript figure and account to suggest another species. Because we have no reason to believe that Blainville ever saw Commerson's manuscript, it is reasonable to assume that Blainville based *C. commersonii* only on Lacepède's figure.

Comparison of Lacepède's figure (1798: Pl. 8, Fig. 1) with Commerson's figure shows general agreement in over-all longitudinal dimensions, in being of a mature or near mature male, and in the placing of the fins, notably in the posterior position of the anal axil relative to the second dorsal axil. Beyond this there is little resemblance between the two figures, particularly in the fin shapes. The most striking difference, however, is the color pattern, Lacepède's figure showing a shark with prominently dark-tipped fins. Commerson's figure does not indicate color, and his color description refers to his specimen only as grey above and white below. In Lacepède's figure the first dorsal and pectoral fins and the dorsal and ventral lobes of the caudal fin are obviously dark-tipped. It is possible that the artist intended the distal margins of the second dorsal, and anal, and the pelvic fins to have a narrow dark edging, but this is not certain.

The presence of a color pattern (i.e., dark-tipped fins) in Lacepède's figure provides strong clues to the identity of *C. commersonii*, for although less than half the known species of *Carcharhinus* have more or less black-tipped fins at some stage of growth, only one species is regularly and as noticeably dark-tipped when mature. The obvious species is *C. melanopterus* (Quoy and Gaimard, 1824), described from "Île Vaigiou" at the western extremity of New Guinea, and now known as a conspicuous and common shallow-water, reef-inhabiting species in the tropical and subtropical Indo-Pacific. It has also been reported from the Mediterranean.

Dark-tipped sharks, other than *C. melanopterus*, which may resemble the figure of *C. commersonii* in the disposition of their fin markings include *C. limbatus* (Müller and Henle, 1841), *C. leucas* (Müller and Henle, 1841), *C. sorrah* (Müller and Henle, 1841), *C. pleurotaenia* (Bleeker, 1852), *C. longimanus* (Poey, 1861), *C. maculipinnis* (Poey, 1865), and others. But in all these species the first dorsal fin is plain or

at most only faintly dusky in the adult stage, though it may be more definitely dark-tipped in embryos and juveniles. This contrasts with *C. melanopterus* in which the first dorsal fin is strikingly dark-tipped in the adult stage—as is also the figure of *C. commersonii* in Lacepède which is obviously adult as evidenced by the clasper size. Agreement between *C. commersonii* and *C. melanopterus* in other features, viz., proportions, fin shapes and sizes, breadth and length of snout, etc., is to say the least, tolerably good. It follows that recognizing *C. commersonii* as conspecific with *C. melanopterus* is plausible, and in fact, not without precedent. Quoy and Gaimard (1824: 194), when first describing *C. melanopterus*, regarded Lacepède's figure of "Le Squalé Requin" as being of their species, and this view was shared later by Müller and Henle (1841: 43), Gray (1851: 46), and Dumeril (1865: 365).

The question of how Lacepède's artist came to change Commerson's manuscript figure into a very reasonable illustration of *C. melanopterus* is likely to remain unanswered. Possibly, the artist was dissatisfied with the bare outline drawing from Commerson's manuscript which he was expected to copy, and looked around for material to dress it up. If this was so, Boeseman (personal communication) has not been able to find in the Paris Museum any specimen of *C. melanopterus* which might definitely have been available for Lacepède's artist to use. However, whatever the source, the illustration is a reasonable representation of *C. melanopterus*, and must stand firstly, as the basis of *C. commersonii* as understood by Blainville, and secondly, as the generally recognized but unavailable type species of *Carcharhinus*. Acceptance of it as a junior synonym of *C. melanopterus*, and validation of the latter as type species of *Carcharhinus* would be a considerable contribution to the stability of selachian nomenclature.

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